

See "Instructions for Filling out the Work Permit" contained in the Work Planning and Control for Experiments and Operations Subject Area.

1. Work request WCC fills out this section.
☐ Standing Work Permit

Requester: Don Lynch	Date: 7/2/2013	Ext.: 2253	Dept/Div/Group: PO/PHENIX
Other Contact person (if different from requester): Carter Biggs			Ext.: 7515
Work Control Coordinator: Don Lynch		Start Date: 7/8/2013	Est. End Date: 10/31/2013
Brief Description of Work: Replace DC east Window, Repair broken wires in DC West Chamber			
Building: 1008	IR & AH	Equipment: DC East & West	Service Provider PHENIX Techs & DC Experts

2. WCC, Requester/Designee, Service Provider, and ESS&H (as necessary) fill out this section or attach analysis

ESS&H ANALYSIS			
Radiation Concerns	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Activation	<input type="checkbox"/> Airborne
	<input type="checkbox"/> Contamination	<input type="checkbox"/> Radiation	<input type="checkbox"/> NORM
	<input type="checkbox"/> Other		
<input type="checkbox"/> Special nuclear materials involved, notify Isotope Special Materials Group			
<input type="checkbox"/> Fissionable/Radiological materials involved, notify Laboratory Nuclear Safety Officer			
Radiation Generating Devices:	<input type="checkbox"/> Radiography	<input type="checkbox"/> Moisture Density Gauges	<input type="checkbox"/> Soil Density Gauges
	<input type="checkbox"/> X-ray Equipment		
Safety and Security Concerns	<input type="checkbox"/> None	<input type="checkbox"/> Explosives	<input type="checkbox"/> Transport of Haz/Rad Material
	<input type="checkbox"/> Pressurized Systems		
<input type="checkbox"/> Adding/Removing Walls or Roofs	<input type="checkbox"/> Critical Lift	<input type="checkbox"/> Fumes/Mist/Dust*	<input type="checkbox"/> Magnetic Fields*
<input type="checkbox"/> Asbestos*	<input type="checkbox"/> Cryogenic	<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Nanomaterials/particles*
<input type="checkbox"/> Beryllium*	<input type="checkbox"/> Electrical	<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Noise*
<input type="checkbox"/> Biohazard*	<input checked="" type="checkbox"/> Elevated Work	<input type="checkbox"/> Lasers*	<input type="checkbox"/> Non-ionizing Radiation*
<input type="checkbox"/> Chemicals/Corrosives*	<input type="checkbox"/> Excavation	<input type="checkbox"/> Lead*	<input type="checkbox"/> Oxygen Deficiency*
<input type="checkbox"/> Confined Space*	<input type="checkbox"/> Ergonomics*	<input checked="" type="checkbox"/> Material Handling	<input type="checkbox"/> Penetrating Fire Walls
<input type="checkbox"/> Vacuum			
* Safety Health Rep. Review Required	<input type="checkbox"/> Haz, Rad, Bio Material Exceed DOE 151.1-C Levels - Contact OEM	<input type="checkbox"/> Other	
Environmental Concerns			
<input checked="" type="checkbox"/> None		<input type="checkbox"/> Work impacts Environmental Permit No.	
<input type="checkbox"/> Atmospheric Discharges (rad/non-rad)	<input type="checkbox"/> Land Use Institutional Controls	<input type="checkbox"/> Soil Activation/contamination	<input type="checkbox"/> Waste-Mixed
<input type="checkbox"/> Chemical or Rad Material Storage or Use	<input type="checkbox"/> Liquid Discharges	<input type="checkbox"/> Waste-Clean	<input type="checkbox"/> Waste-Radioactive
<input type="checkbox"/> Cesspools (UIC)	<input type="checkbox"/> Oil/PCB Management	<input type="checkbox"/> Waste-Hazardous	<input type="checkbox"/> Waste-Regulated Medical
<input type="checkbox"/> High water/power consumption	<input type="checkbox"/> Spill potential	<input type="checkbox"/> Waste-Industrial	<input type="checkbox"/> Underground Duct/Piping
Waste disposition by:		<input type="checkbox"/> Other	
Pollution Prevention (P2)/Waste Minimization Opportunity:		<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	
FACILITY CONCERNS			
<input checked="" type="checkbox"/> None		<input type="checkbox"/> Intermittent Energy Release	
<input type="checkbox"/> Access/Egress Limitations	<input type="checkbox"/> Electrical Noise	<input type="checkbox"/> Potential to Cause a False Alarm	<input type="checkbox"/> Vibrations
	<input type="checkbox"/> Impacts Facility Use Agreement	<input type="checkbox"/> Temperature Change	<input type="checkbox"/> Other
<input type="checkbox"/> Configuration Management	<input type="checkbox"/> Maintenance Work on Ventilation Systems	<input type="checkbox"/> Utility Interruptions	
WORK CONTROLS			
Work Practices			
<input type="checkbox"/> None	<input type="checkbox"/> Exhaust Ventilation	<input checked="" type="checkbox"/> Lockout/Tagout	<input type="checkbox"/> Spill Containment
	<input type="checkbox"/> Security (see Instruction Sheet)		
<input checked="" type="checkbox"/> Back-up Person/Watch	<input type="checkbox"/> HP Coverage	<input type="checkbox"/> Posting/Warning Signs	<input type="checkbox"/> Time Limitation
	<input type="checkbox"/> Other		
<input type="checkbox"/> Barricades	<input type="checkbox"/> IH Survey	<input checked="" type="checkbox"/> Scaffolding-requires inspection	<input type="checkbox"/> Warning Alarm (i.e. "high level")
	<input type="checkbox"/> Electrical Inspection Required		
Personal Protective Equipment			
<input type="checkbox"/> None	<input type="checkbox"/> Ear Plugs	<input checked="" type="checkbox"/> Gloves as appropriate	<input type="checkbox"/> Lab Coat
	<input checked="" type="checkbox"/> Safety Glasses as appropriate		
<input type="checkbox"/> Coveralls	<input type="checkbox"/> Ear Muffs	<input type="checkbox"/> Goggles	<input type="checkbox"/> Respirator*
	<input type="checkbox"/> Safety Harness		
<input type="checkbox"/> Disposable Clothing	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Hard Hat	<input type="checkbox"/> Shoe Covers
	<input checked="" type="checkbox"/> Safety Shoes	<input type="checkbox"/> High visibility cloths/vest	<input type="checkbox"/> Other
Permits Required (Permits must be valid when job is scheduled.)			
<input checked="" type="checkbox"/> None	<input type="checkbox"/> Cutting/Welding	<input type="checkbox"/> Impair Fire Protection Systems	
<input type="checkbox"/> Concrete/Masonry Penetration	<input type="checkbox"/> Digging/Core Drilling	<input type="checkbox"/> Rad Work Permit-RWP No	
<input type="checkbox"/> Confined Space Entry	<input type="checkbox"/> Electrical Working Hot	<input type="checkbox"/> Other	
Dosimetry/Monitoring			
<input checked="" type="checkbox"/> None	<input type="checkbox"/> Heat Stress Monitor	<input type="checkbox"/> Real Time Monitor	<input type="checkbox"/> TLD
<input type="checkbox"/> Air Effluent	<input type="checkbox"/> Noise Survey/Dosimeter	<input type="checkbox"/> Self-reading Pencil Dosimeter	<input type="checkbox"/> Waste Characterization
<input type="checkbox"/> Ground Water	<input checked="" type="checkbox"/> O ₂ /Combustible Gas	<input type="checkbox"/> Self-reading Digital Dosimeter	<input type="checkbox"/> Other
<input type="checkbox"/> Liquid Effluent	<input type="checkbox"/> Passive Vapor Monitor	<input type="checkbox"/> Sorbent Tube/Filter Pump	
Training Requirements (List specific training requirements)			
PHENIX Awareness, C-A User or equivalent, scaffold training, ladder training, working at heights, manlift specific toolbox training			
Based on analysis above, the Review Team determines the risk, complexity, and coordination ratings below:		If using the permit when all hazard ratings are low, only the following need to sign: (Although allowed, there is no need to use back of form)	
ESS&H Risk Level:	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High	WCC:	Date:
Complexity Level:	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> High	Service Provider:	Date:
Work Coordination:	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> High	Authorization to start	Date:
(Department/Division, or their equivalent, Sup/WCC/Designee)			

3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)

Work Plan (procedures, timing, equipment, scheduling, coordination, notifications, and personnel availability need to be addressed in adequate detail): See Attached work plan description: wear O2 monitor during removal of window.

Special Working Conditions Required (e.g., Industrial Hygiene hold points or other monitoring)

None

Notifications to operations and Operational Limits Requirements: None

Post Work Testing, Notification or Documentation Required:

Job Safety Analysis Required: ☐ Yes ☒ No

Review Done: ☒ in series ☐ team

Reviewed by: * Primary Reviewer signature means that the Review Team members were appropriate for the work that was planned, the Team visited the job site, hazards and risks that could impact ESS&H have been considered and controls established according to BNL requirements. In addition, this signature indicates that applicable JRAs, FRAs, as well as other planning documents have been reviewed and training requirements have been identified and recorded on this permit.

Title	Name (print)	Signature	Life #	Date
ES&H Professional				
F&O Facility Project Manager				
Service Provider				
Work Control Coordinator	Don Lynch		20146	
Safety Health Representative				
Research Space Manager				
Other				
Other (PHENIX Escort)				
Required Walkdown Completed				
*Primary Reviewer				

4. Job site personnel (Supervisor and workers) fill out this section.

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments) and all training required for this permit is current/complete. Job Supervisor/Contractor Supervisor signatures also includes verification that worker training required for this permit is current/complete.

Job Supervisor:		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:

Workers are encouraged to provide feedback on ESS&H concerns or on ideas for improved job work flow. Use feedback form or space below.

5. Department/Division, or their equivalent, Line Manager or Designee

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)

Name:	Signature:	Life#:	Date:
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6. Worker provides feedback.

Worker Feedback (use attached sheets as necessary)

a) WCM/WCC: Are there any changes as a result of worker feedback? ☐ Yes ☐ No

Note: See Work Planning and Control for Experiments and Operations Subject Area section 2.6.

7. Post Job Review/Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of job site to work supervisor.) The WCC ensures that the change process to update drawings, placards, postings, procedures, etc., is initiated, if necessary.

Name:	Signature:	Life#:	Date:
Comments:			

DC East and West repairs in the PHENIX Experimental Hall and Assembly Hall (bldg. 1008).

Problem

Years of wire repairs on the DC east have rendered the DC east window a patchwork of tape and have elevated leak rates to the point where replacement of the mylar window is needed. The design of the DC east window is similar to the DC west which had its window replaced during last year's shutdown (2012). In addition, while the window is removed, any broken wires found will be removed as well.

The techniques to affect these repairs have been established by the DC group experts in a prior shutdown when the DC East Window was replaced the first time and last year when the DC west window was replaced, and in yearly maintenance to remove broken wires. These tasks are handled as worker-planned work within the guidelines of the PHENIX Awareness training.

In addition, prior to the DC East window replacement, DC experts will perform troubleshooting on various DC East and DC West electronic components to identify and address faults and defects observed during run 13.

The procedure by which this repair will be accomplished is provided below.

Work Plan

This work is to be done by fully trained and experienced personnel (PHENIX mechanical and electrical technicians and DC expert scientists) during the 2012 maintenance shutdown period and is expected to require about 3-4 weeks.

DC East and DC West electronics troubleshooting and repairs.

Access to the power supply modules is by extension ladders set up between the central magnet (CM) outrigger and the RICH vessel on the west carriage. For the higher modules, two ladders will be secured side-by-side, tied together, to allow climbing by the CM pole piece. As flammable gas is not flowing anywhere in the IR during summer shutdown periods, there is no danger of a flammable gas mishap, and the location of the repairs is far enough removed from the DC, PC, or TEC gas windows that there is no chance of damage to their gas volumes. The Drift Chamber high and low voltage will be turned off.

For work on the DC West, ladders will be erected and secured to the CM outriggers and the 12-ton building crane will be positioned such to place the eye of a sling directly above the work area, then locked out. A harness will be worn and clipped to the sling while the work is being performed. A watch must be present at all times when someone is up on the ladders. All work in the IR will be supervised by Carter Biggs.

Work will involve trouble shooting of the modules and cables, and repair or replacement as appropriate.

- Ensure that power to the DC electronics is secured and that the CM power key is locked out of use.
- Erect and secure 1 (or 2 side by side if necessary) extension ladders between the top of the central magnet outrigger and the rich detector.
- Set up a tie off point just above the working position using the building crane and an adequately rated sling.
- The position of the tie off point is to be set for each working level and the crane must be locked out before the worker ascends the ladder.
- The worker is to use a body harness with a short clip-on lanyard and tie off before starting work.
- A watch person must be present at all times when a person is on the ladder
- DC experts shall perform appropriate troubleshooting tasks to determine extent of problem then repair in place, remove and replace or remove for bench repair the offending electronic equipment.
- Reinstall any bench repaired equipment

For work on the DC east, troubleshooting and repairs will utilize the stable vertical manlifts described below. The troubleshooting and repair actions will be similar.

DC East Window Replacement

Prior to Repairs

1. CAD shall provide 2 sizzor style manlift workplatforms from which the repair work will be performed. CAD will provide appropriate manlift tool box training to all PHENIX technicians and DC experts who will be using these manlifts.
2. PHENIX engineering shall design a suitable enclosure over the DC east and the work platforms to minimize the chances of dust particles invading the DC east chamber while the window is removed. The enclosure shall create a “clean room-tent” and shall include a heap filter blowing down from the top to create a positive pressure in the tent. The filter and tenting material shall be mounted to the top of the DC work platform and DC itself. The tent will be erected by PHENIX mechanical technicians assisted by BNL carpenters from FR4 polyethylene material and unistrut frame as necessary and appropriate.

3. At least 48 hours prior to the commencement of the subject repairs, all power to the detector shall be turned off and the flow of gas shall be turned off.
4. All personnel involved in these repairs shall have PHENIX awareness training, C-A User or equivalent training and ladder user training. In addition, personnel shall have appropriate skill training as required to accomplish the subject repairs as worker planned work.

Repair

5. DC experts will access the face of the DC East magnet using the CAD supplied manlifts.
6. PHENIX technicians and DC experts shall cut and remove the retaining strings from the face of the DC detector, then remove the frame hardware and frames holding the window.
7. Technicians shall then clean an epoxy residue from the fastening studs, repairing and or replacing studs as necessary.
8. DC experts shall look for broken wires throughout the DC East cavity and individually locate the coiled broken wires.
9. Once a broken wire is located it shall be carefully uncoiled from any intact wires it has become wrapped around, pulled out through DC Face and clipped at its end mounting point(s).
10. Steps 8-9 shall be repeated as necessary until all broken wires have been removed entirely from the cavity and clipped at each end mounting point.
11. After all wires have been removed as described, the new mylar window shall be stretched across the face and mounted using the new frames, mounting hardware and gasket material (see drawings). Fasteners shall be tightened to achieve a firm seal on all 4 edges of the window.
12. After the window has been sealed the retaining strings shall be tightly serpentine around each of the pins to provide support for the window when pressurized.
13. After the window retaining strings have been installed, nitrogen flow shall be re-instated and pressure brought to operating parameters.
14. At this point the detector shall be fully tested for leaks, and, if necessary, tape and adhesive shall be applied/augmented until any leak has been sealed to acceptable levels (per PHENIX DC/PC Gas System Operating Procedure PP-2.5.2.04-04 rev A).

15. After completion of leak tests, remove the tent, filters and work platforms and store appropriately for future use.
16. Only after leak levels are acceptable shall flammable gas mixture be re-introduced.
(Note: flammable gas shall not be introduced until the end of the shutdown when PHENIX blue sheet tests have been completed and the integrity of all PHENIX gas system safety controls has been verified and documented in accordance with PHENIX/C-AD OPM # 11.2.3 PHENIX Flammable Gas System Operating Procedure.
17. Once flammable gas has been re-started , check again with high sensitivity gas detection equipment to verify that leak rates are within allowable range.
18. Post repairs work closeout

After all repairs and tests are completed, the DC East and/or West shall be restored to its normal operating position (if necessary) on the DC support rails.

Any lessons learned, problems encountered and their solutions should be recorded in the appropriate section of the work permit to which this procedure is attached.

PHENIX 2013 SHUTDOWN



DC EAST & WEST
TROUBLESHOOTING & REPAIRS

7/2/2013
Don Lynch

6/27/2013



DC East Repairs/Upgrade

Similar to the work done on the DC West last year, the DC East will have its window replaced to repair the wear that years of wire repairs rendering the DC East window a patchwork of tape and have elevated leak rates to the point where replacement of the mylar window is needed.

6/27/2013

- East Carriage move to AH
- Design & Construct tent (similar to tent constructed for DC West last year) to prevent foreign material from entering DC East cavity while window is removed.
- CAD to provide wide vertical lift to allow DC experts to remove and replace window
- Get supplies and materials from Stony Brook for window replacement
- Electronics troubleshooting and repair
- Remove and replace window
- Isolate and repair leak under electronics card
- Leak test
- Operational tests
- Remove tent and manlift

CM Lift
Table
Extension
Step



